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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

FOREST INSECT CONDITIONS IN THE YELLOWSTONE NATIONAL PARK SEASON 1931

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February 10, 1932

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For information of
Mr. Miller

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Respectfully submitted,

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INTRODUCTION

Some few years ago a policy of submitting to the National Park Service a somewhat formal report covering the status of forest insect conditions within the forests of the Yellowstone National Park was adopted by the Bureau of Entomology. The bringing together of information previously submitted through correspondence, conferences, etc., for areas as important as the Yellowstone, in order to make it available for all offices concerned, is believed to be of sufficient importance to justify the continuance of this practice.

During the past few years a number of different insect outbreaks have occurred within the various forest types of the Yellowstone Park. In an area with as many different forest conditions as exist within the Yellowstone, and which is used so intensively, one can perhaps expect such situations to occur. Some of these have resulted in considerable destruction to the timber stands involved while others, though containing certain potential dangers, proved to be of no serious importance. A discussion of these outbreaks follows:

LODGEPOLE NEEDLE TYER (Eulia sp.)
LODGEPOLE SAWFLY (Neodiprion sp.)

During the past season there has been no change in the status of the outbreak of these two insects which occurred within the lodgepole pine stands at West Yellowstone in 1922. The spraying operation which was

instituted in 1924 against this epidemic was discontinued with the 1927 season. Since that time there has been no further destruction of timber, and it is apparent that this outbreak has been held in check by natural enemies. Considerable needle tyer work is still to be found, though it seems to be causing no serious or permanent injury to the trees. Each year a few sawfly larvae are recorded; however, the injury resulting from their feeding can be considered as negligible in character. There is surely no evidence at this time of a recurrence of the 1922 epidemic.

SPRUCE BUDWORM (Cacoecia fumiferana Clem.)

There is no further evidence of the spruce budworm epidemic which existed some few years ago along the Yellowstone River, aside from the large areas of dead Douglas fir which stand as mute reminders of the seriousness of this outbreak. The insects seem to have completely disappeared, as for the past three years no larvae have been recorded.

The severe outbreak of this insect within the lodgepole pine stand in the southwest corner of the Park continued during the 1931 season, though it is believed that there was a rather marked decrease in its severity. During the course of this epidemic a rather large per cent of the lodgepole pine within the heavily infested area has been killed. Four sample plots, containing a total of 487 trees, were established in this area during the season of 1929. A check of these plots in the fall of 1931 shows that 21 per cent of the trees are now dead. For the different plots this loss varies from a minimum of 6 per cent to a maximum of 36 per cent, indicating that they had been located so as to fairly represent the different degrees of infestation.

In the Cody Canyon, an area immediately adjacent to the Yellowstone, the severe epidemic of the spruce budworm which has existed within the Douglas fir stands of that region for the past few years showed a marked decrease in the severity of the defoliation during the past season. An experimental spraying program was again instituted in this area for the purpose of testing the efficiency of various sprays and to afford all possible protection to the trees surrounding the many summer homes and resorts. Though a number of selected plots were treated with different sprays, and at different times, due to the rather marked decline in this infestation it was rather difficult to measure the effectiveness of the different treatments. This area will be kept under observation during the coming season and if found necessary the trees around the summer homes and resorts will again be sprayed.

DOUGLAS FIR BEETLE (Dendroctonus pseudotsugae)

For several years it was feared that the outbreak of the Douglas fir beetle, which occurred in the areas defoliated by the spruce budworm along the Yellowstone River, would, when the supply of defoliated timber was exhausted, spread into the uninjured fir stands adjacent. This area has been carefully watched for the past few years, and it would seem that all danger of such an occurrence has passed.

It is of interest to note that history has repeated itself and that during the past season a severe outbreak of this insect developed within the Douglas fir forest of the Cody Canyon, which had been weakened by spruce budworm defoliation. Control measures were instituted in the fall of 1931,

and a rather thorough cleanup made of the infested areas. The success of this project will not be known until the 1932 season.

ALPINE FIR BEETLE (Dryocoetes confusus)

An outbreak of the alpine fir beetle in the alpine fir stands adjacent to Duck Lake was recorded in 1929. In the fall of that year some 400 of these trees were treated, and in 1930 there were but 30 newly attacked trees to be found. Though these trees were treated in the fall of 1930, there were still some 15-20 trees infested during the 1931 season. It is believed that this reinfestation occurred from a few trees, showing no external evidence of attack, which were missed during the control operation. Furthermore, it is apparent that trees are attacked in the upper portion of the bole, which makes the detection of such infested trees by the spotters rather impossible. Though it was recommended that the 1931 infestation be treated, it is fully realized that a complete cleanup of this outbreak will be difficult to secure, and that it may not be possible to reduce the outbreak to a point much lower than that which exists at this time.

SPIDER MITES (Bryobia practiosa Koch)

During the 1929 season it was found that the Douglas fir trees along the Madison River, at the bridge between West Yellowstone and Madison Junction, were badly infested with a spider mite. This is the first record which we have of this pest becoming a serious enemy of forest trees. Though the foliage of the infested trees was severely injured, no control measures were recommended due to the expense of the operation, and because it was believed that no permanent damage to the trees would follow. During

the 1930 season the injury was not so severe and in 1931 there was little evidence of the feeding of this insect. It is believed that all danger from this outbreak has passed.

OREGON ENGRAVER BEETLE (Ips oregoni)

Though there are scattered attacks of Ips throughout the lodgepole pine forests of the Park, there are but few of these where the insect can be considered as the primary agency responsible as most of the trees show some previous mechanical injury. Scorching from fires employed in roadside cleanup, covering of root systems from road grading and building excavations, injury to the soil, roots and boles of trees in camp grounds as a result of tourist travel, and the action of geyser formations, are some of the most important of these injuries. The effects of these secondary Ips attacks are being felt more severely within the camp grounds, which is especially true for Old Faithful. Each year an additional number of these weakened trees succumb to the attacks of these insects, so that in a very few years the timber stands throughout the cabin camp and camp ground will be seriously deleted. It is fully recognized that as long as the primary source of injury continues, the death of these trees is inevitable; however, it has been recommended that all such trees containing broods of Ips oregoni be felled and burned. This recommendation calling for the treatment of the secondary agency responsible for the death of the trees is based upon the fact that if every opportunity is not taken to destroy these brood, the insect population would be materially increased, resulting in a greater annual loss. By treating these trees this annual loss is kept

at a minimum, which of course is to be desired. These camp grounds should be kept under constant observation, and as these infested trees are located they should be promptly cut and burned. This extra precaution is necessary as in 1931 a number of trees were found from which the beetle had emerged, which of course resulted in an increased loss.

The matter of tourist injury and the future of these heavily used camp grounds has been discussed in previous reports. However, it would seem well to again emphasize the importance of this serious situation and to urge that necessary precaution be taken in order to avoid a recurrence of this situation and to repair as far as possible the devastation already wrought. The work of reforesting these areas, which is being conducted by the Yellowstone Park officers, is to be highly commended. It is indeed a forward step looking toward the happiness of those who will enjoy the Park in the years to come.

MAMMOTH CAMP GROUND

Since 1929 the limber pine on the camp ground at Mammoth has been in a very decadent condition, which was undoubtedly due to the excessive tramping of the soil and injury to the roots from tourist travel. As at that time the trees were rather heavily infested with aphids, it was recommended that they be sprayed with nicotine sulphate in the hopes that in some way their recovery might be aided. During the late summer and fall following this treatment the trees appeared to be in a healthier condition. However, in 1930 they were again found to be heavily infested with both aphids and spider mites and were again sprayed with Volck and nicotine sulphate, which seemed to effectively destroy both insects, and the trees again

appeared to be in a somewhat healthier condition. In recommending these control measures, it was fully realized that no effort was being made to strike at the primary agency responsible for this condition, which is, as stated, the mechanical injuries associated with excessive camping. These trees are living under such abnormal conditions that they are very susceptible to the attacks of secondary insects, and the task of keeping them alive for any great number of years will prove to be a very serious problem, if not an impossibility.

Early in 1931 these trees were examined and found to be in a far more decadent condition than ever before. This was especially true of the trees along the lower edge of the camp ground, where the camping is always excessively heavy. In the upper portion of the camp ground, on the steeper slopes where the camping has not been so severe, the trees are in a much better condition. A number of secondary insects could be found on the limbs and foliage of these trees, but in no instance could they be considered as being responsible for the existing condition. No further spraying was recommended as it was not believed that such action would be of any lasting benefit.

The preservation of these valuable trees is indeed questionable. It is possible that through the adoption of very drastic measures a large per cent of them may still be preserved. Such action would of course necessitate the prevention of further tourist injury, and restoration of the site to as near natural conditions as possible.

MOUNTAIN PINE BEETLE (Dendroctonus monticolae)

As this situation has been thoroughly covered in formal reports

submitted by both Park officials and the Bureau of Entomology, it seems unnecessary to repeat any of this information.

YELLOWSTONE AERIAL SURVEY

This survey was instituted in 1930 to determine if there were any serious mountain pine beetle infestation within the park area. During this survey only a few red top (1929 attacked trees) were recorded, and as a result of this information it was assumed that there were no serious situations existing. It was estimated that during this survey approximately 856,000 acres, or 38 per cent of the total park acreage, were covered at a cost of .0923 cents per acre. The cost of the 1930 survey amounted to $790.00, which was slightly inflated by two days of "stand-by time", due to rainy weather.

In 1931 this survey was again repeated, with Mr. Terrell again acting as observer. As a result of this aerial reconnaissance a number of what appeared to be serious insect situations were recorded. Groups of red tops (1930 attacked trees) were observed at the "Crags","Red Mountains", and "West Creek". However, small groups and single trees were found fairly well distributed throughout the mature lodgepole pine stands. During this survey three trips of about 450 miles were made over the park, which does not include the flying time from Livingston, the flying base used, to Gardiner, a distance of 50 miles. Some 770,560 acres were covered during this survey, which in turn does not include an area of 80,000 acres which was of a necessity covered more than once as a result of using the Gardiner entrance. The cost of this survey amounted to $602.44, which when applied to the 770,560 acres covered shows a cost of .078 cents per acre.

From the 1931 aerial survey valuable information was secured, which contributed toward a better appreciation of the mountain pine beetle situation within the Park. Following this survey Mr. Terrell spent considerable time on the ground in checking as many of the spots of infestation recorded from the air as could be found.

The value of the airplane for such extensive surveys as this can hardly be questioned. Though expensive, information is obtained in a few hours which would take weeks or months to secure from the ground, and this time element is often of vital importance. However, it is believed that the field of the airplane in securing information on barkbeetle epidemics lies primarily in extensive reconnaissance. After barkbeetle infestations have been found to exist within an area the information which one can secure from the air is of such little value that the use of an airplane is very questionable. The data which is secured from the air is always one year behind the actual status of the infestation, as only "red tops" (trees attacked the previous season) can be located. Where it is known that infestations occur, ground work will produce far more valuable information, in an equally economical manner.

CONCLUSIONS

As previously stated, this report can only be considered as a recapitulation or bringing together of information previously submitted. There are no serious insect outbreaks within the Park at this time, except of course the mountain pine beetle epidemic, which has been adequately covered in previously submitted reports.